

The opinion in support of the decision being entered today was **not** written for publication and is **not** binding precedent of the Board.

Paper No. 22

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte ACHIM HARTMANN

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Appeal No. 1998-2248  
Application No. 08/552,407

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HEARD: April 26, 2001

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Before WARREN, WALTZ, and TIMM, Administrative Patent Judges.  
WALTZ, Administrative Patent Judge.

**DECISION ON APPEAL**

This is a decision on an appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1 through 16, which are the only claims pending in this application.<sup>1</sup>

According to appellant, the invention is directed to the manufacture of titanium dioxide by the chloride process where a

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<sup>1</sup> The amendment dated May 5, 1997, Paper No. 5, was refused entry by the examiner in the Advisory Action dated May 8, 1997, Paper No. 6. The response and Declaration under 37 CFR § 1.132 dated July 21, 1997, Paper Nos. 9 and 10, respectively, was considered by the examiner as per the Advisory Action dated July 31, 1997, Paper No. 11.

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single stage separation is accomplished on the output from the fluidized bed chlorinator with the underflow from a hydrocyclone recycled to the chlorination process (Brief, pages 2-3).<sup>2</sup> A copy of illustrative claims 1 and 9 is attached as an Appendix to this decision.

The examiner has relied upon the following references as evidence of obviousness:

Oppegaard et al. (Oppegaard)	3,050,362	Aug. 21, 1962
Hildreth	3,227,545	Jan. 4, 1996

Paige et al. (Paige), "Physical Beneficiation of Titanium Plant Solid Wastes: Recovery of Titanium Minerals and Coke," Bureau of Mines Report of Investigations, pp. 1-23 (1982).

Claims 1 and 4-8 stand rejected under 35 U.S.C. § 103 as unpatentable over Paige (Answer, page 4). Claims 2, 9 and 11-16 stand rejected under 35 U.S.C. § 103 as unpatentable over Paige in view of Hildreth (Answer, pages 8 and 10).<sup>3</sup> Claims 3 and 10 stand rejected under 35 U.S.C. § 103 as unpatentable

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<sup>2</sup> All citations to the Brief refer to the substitute Brief dated Dec. 22, 1997, Paper No. 16.

<sup>3</sup> In the interest of judicial economy, we have grouped the rejections of claim 2 and claims 9 and 11-16 together since these claims were rejected under section 103 over the same combination of references. We do likewise for the rejections of claims 3 and 10 *infra*.

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over Paige in view of Hildreth and Oppegaard (Answer, pages 9 and 11). We reverse all of the examiner's rejections essentially for the reasons stated in the Brief and the reasons below.

#### OPINION

Appellant and the examiner do not contest the findings of the examiner regarding Paige (see the Answer, pages 4-6; Brief, page 12). However, appellant and the examiner disagree as to the scope of the claims, e.g., claim 1, with the examiner stating that the "comprising" language of the claim does not exclude the gravity concentration steps of Paige while appellant argues that his invention requires only a single separation and need not undergo additional processes (Answer, pages 6 and 12; Brief, page 16). The examiner's further position is that, regardless of the claim construction, it would have been obvious to one of ordinary skill in the art to eliminate a process step in Paige along with its function (Answer, pages 6 and 12).

Implicit in our review of the examiner's obviousness analysis is that the claim must first have been correctly

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construed to define the scope and meaning of each contested limitation. *See Gechter v. Davidson*, 116 F.3d 1454, 1460 n.3, 43 USPQ2d 1030, 1035 n.3 (Fed. Cir. 1997). Accordingly, we must construe claim 1 on appeal to define its scope and meaning.

The examiner is correct in stating that use of the transitional language "comprising" is "open-ended" and means that the named elements are essential, but other elements may be added and still be within the scope of the claim. *See Vehicular Technologies Corp. v. Titan Wheel International Inc.*, 212 F.3d 1377, 1383, 54 USPQ2d 1841, 1845 (Fed. Cir. 2000); *Genentech Inc. v. Chiron Corp.*, 112 F.3d 495, 501, 42 USPQ2d 1608, 1613 (Fed. Cir. 1997). However, in claim 1 on appeal, the "named elements" that are listed as essential include steps (c) and (d), where step (c) produces a titanium dioxide-rich fraction from the hydrocyclone classification and step (d) requires that *this* recovered titanium dioxide-rich fraction be returned to the chlorination reactor. Accordingly, we determine that the claimed transitional language "comprising" is restricted by the named steps requiring that the recovered

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titanium dioxide-rich fraction is returned to the chlorination reactor.

In view of the claim construction *supra*, we determine that the examiner's findings from Paige do not establish a *prima facie* case of obviousness. As recognized by the examiner, Paige teaches recycle of a titanium dioxide-rich fraction from the hydrocyclone that has been treated by gravity concentration (i.e., tabling; see the Answer, page 6, and Paige, page 23, left column). The examiner has failed to present any convincing evidence or reasoning to support a conclusion that it would have been obvious to recycle the untreated underflow fraction from the hydrocyclone (i.e., Sample C). The examiner's position that omission of a step (i.e., gravity concentration) with its attendant loss of function would have been obvious is not supported by the teachings of Paige that gravity concentration is essential to the recycle process. See Paige, paragraph bridging pages 8-9, where it is taught that Sample C (hydrocyclone waste) is subjected to gravity concentration and a sizing step to remove silica gangue "since all of the commercial producers expressed concern about the

silica content of potential recycle concentrates." The gravity separation scheme results in a much higher concentration of titanium dioxide and a much lower amount of silica (see Sample C, page 11, right column, compared with Sample C, page 4, Table 1). Paige also teaches the benefits of installing a hydrocyclone in the waste stream circuit before gravity concentration to recover a high-grade titanium ore and that only the recovered concentrate could be recycled (page 22, left column, first paragraph, and right column, first two paragraphs). Finally, Paige teaches waste materials "treated by gravity concentration to produce a recyclable titanium concentrate" where the amount of titanium dioxide in the gravity concentrate ranges from 69 to 90.7 weight % and "should be recyclable" (page 23).

With regard to the examiner's rejections applying Paige in combination with Hildreth against claims reciting the additional process step of grinding before recycling,<sup>4</sup> our comments above about Paige equally apply. Additionally, we

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<sup>4</sup> Claims 2 and 9, and dependent claims 3 and 10-16, respectively, recite an additional step of grinding the recovered titanium dioxide-rich fraction so that at least 50% of the particles of the fraction are smaller than 0.1 mm.

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agree with appellant that Paige teaches away from grinding and suggests agglomeration is necessary before recycling (Brief, pages 13-14). Paige teaches that the fine particle size of the recovered concentrate and coke flotation product would require agglomeration to the size of the virgin feedstock before they could be recycled or these particles would be entrained in the gas stream and lost (page 22, right column; "pelletization" is taught on page 23, left column). The examiner's application of Hildreth fails to remedy this deficiency in Paige. The examiner applies Hildreth to show an "analogous process" where the feedstock is crushed and ground to a desired particle size of 100% minus 200 mesh (i.e., less than 74 microns or 0.074 mm; Answer, pages 8-9).

Evidence of a suggestion, teaching, or motivation to combine references may flow from the references themselves, the knowledge of one of ordinary skill in this art, or from the nature of the problem to be solved. See *Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1630 (Fed. Cir. 1996). "The showing must be clear and particular." *In re Dembiczak*, 175 F.3d 994, 999, 50 USPQ2d

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1614, 1617 (Fed. Cir. 1999). The examiner has not presented any convincing evidence or reasoning why the combined prior art references suggest the desirability of making the proposed modification. The examiner has only found that Paige teaches that the recycled material must be of the size range of the virgin feedstock (Answer, page 8, citing Paige, page 22, right column, second full paragraph). The examiner has not presented any convincing evidence or reasoning why one of ordinary skill in the art would desire the particle size range taught by Hildreth in the process of Paige. See *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1462, 221 USPQ 481, 488 (Fed. Cir. 1984).

Hildreth teaches that "[f]or extraction of vanadium with gaseous chlorine, it has been established that the material should be crushed to at least -10 mesh and crushing to -200 mesh is sometimes desirable." See col. 2, ll. 38-41. Since Paige is not specific to the extraction of vanadium by chlorination and the examiner has not presented any convincing reasons for the combination of references, we determine that the examiner has failed to meet the initial burden of

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establishing a *prima facie* case of obviousness. Accordingly, the Fiand Declaration under 37 CFR § 1.132 (Exhibit G attached to the Brief) need not be considered. See *In re Geiger*, 815 F.2d 686, 688, 2 USPQ2d 1276, 1278 (Fed. Cir. 1987).

The Oppegaard reference was applied by the examiner to show that drying of leached material before recycling was known in an "analogous process" (Answer, pages 9-10). Therefore Oppegaard does not remedy the deficiencies noted above with respect to Paige and Hildreth.

For the foregoing reasons and those set forth in the Brief, we determine that the examiner has not established a *prima facie* case of obviousness in view of the reference evidence. Accordingly, the rejection of claims 1 and 4-8 under 35 U.S.C.

§ 103 over Paige is reversed. Similarly, the rejections of claims 2, 9 and 11-16 under 35 U.S.C. § 103 over Paige in view of Hildreth are reversed. The rejections of claims 3 and 10 under 35 U.S.C. § 103 over Paige in view of Hildreth and Oppegaard are also reversed.

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The decision of the examiner is reversed.

**REVERSED**

CHARLES F. WARREN	)	
Administrative Patent Judge	)	
	)	
	)	
	)	BOARD OF PATENT
THOMAS A. WALTZ	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
	)	
	)	
CATHERINE TIMM	)	
Administrative Patent Judge	)	

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**APPENDIX**

1. In a process for the production of titanium dioxide by chlorination of titanium-containing ore in a fluidized bed chlorination reactor which includes discharging from the reactor a mixture comprising metal chlorides and other material including unreacted titanium dioxide ( $TiO_2$ ) and silica ( $SiO_2$ ) from the ore, and coke, the improvement comprising;

(a) cooling the mixture to form a solid mixture containing solid particles of condensed metal chlorides and titanium dioxide, coke and silica,

(b) suspending the solid mixture in an aqueous suspension,

(c) classifying the solids particles of the aqueous suspension in a hydrocyclone or hydrocyclones connected in parallel to create two recovered fractions one of which is titanium dioxide-rich but which still contains some quantity of silica and coke;

(d) and then without any further classification step returning the recovered titanium dioxide-rich fraction to the chlorination reactor in a stream with chlorine-containing gas.

9. In a process for the production of titanium dioxide by chlorination of titanium-containing ore in a fluidized bed chlorination reactor which includes discharging from the reactor a mixture comprising metal chlorides and other material including unreacted titanium dioxide ( $TiO_2$ ) and silica ( $SiO_2$ ) from the ore, and coke, the improvement comprising;

(a) cooling the mixture to form a solid mixture containing solid particles of condensed metal chlorides and titanium dioxide, coke and silica,

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(b) suspending the solid mixture in an aqueous suspension,

(c) classifying the solids particles of the aqueous suspension in a hydrocyclone or hydrocyclones connected in parallel to create two recovered fractions one of which is titanium dioxide-rich but which still contains some quantity of silica and coke;

(d) grinding the recovered titanium dioxide-rich fraction so that at least about 50 % of the particles of the fraction are smaller than 0.1 mm, and

(e) and then without any farther classification step returning the ground recovered titanium dioxide-rich fraction to the chlorination reactor.

***Jenine Gillis***

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Copies:

\_\_\_\_\_ APJ WALTZ

\_\_\_\_\_ APJ TIMM

\_\_\_\_\_ APJ WARREN

DECISION: REVERSED

Panel Change: Yes    No

Prepared: July 16, 2002

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ACTS 2 \_\_\_\_

BOOK \_\_\_\_

DISK (FOIA) \_\_\_\_

MONTHLY REPORT \_\_\_\_